Flint Lake
Aquatic Vegetation Management Plan
2007 Update
Porter County, Indiana

February 14, 2008

Prepared for:
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Executive Summary

Aquatic Control was contracted by the Valparaiso Lakes Area Conservancy District (VLACD) to complete aquatic vegetation sampling in order to update the Flint Lake 2007 through 2011 lake wide, long-term integrated aquatic vegetation management plan.

Aquatic vegetation is an important component of Indiana Lakes. Aquatic vegetation provides fish habitat, food for wildlife, prevents erosion, and can improve overall water quality. However, as a result of many factors, this vegetation can develop to a nuisance level. Nuisance aquatic vegetation, as used in this paper, describes plant growth that negatively impacts the present uses of the lake including fishing, boating, swimming, aesthetic, and lakefront property values. The primary nuisance species within Flint Lake are the invasive exotic species Eurasian watermilfoil (*Myriophyllum spicatum*) and curlyleaf pondweed (*Potamogeton crispus*). Common coontail (*Ceratophyllum demersum*) is also abundant in Flint Lake and can create nuisance conditions.

The primary plant control recommendation from the original plan was to initiate treatment of Eurasian watermilfoil with Renovate herbicide. In addition, it was also recommended to continue monitoring submersed plant populations with spring invasive species mapping and summer Tier II surveys. The original plan also recommended that curlyleaf pondweed should be considered for control once Eurasian watermilfoil was reduced.

VLACD received a $14,400 grant from LARE in order to carry out the Eurasian watermilfoil treatment and sampling on Flint Lake. On May 15, 2007, a spring invasive species mapping survey was completed by Aquatic Control to locate and record beds of invasive plants. Approximately 24 acres of Eurasian watermilfoil and 23 acres of curlyleaf pondweed were mapped. On June 6, 24.4 acres of Eurasian watermilfoil was treated by Aquatic Control with Renovate3 aquatic herbicide. The treatment successfully controlled the Eurasian watermilfoil within Flint Lake.

On August 8, 2007, a Tier II survey was conducted by Aquatic Control on Flint Lake. The purpose of this survey was to document the changes in the native plant community and document the efficacy of the herbicide treatment. Eurasian watermilfoil was not detected on Flint Lake during the summer Tier II survey. Native vegetation remained abundant, but there were shifts in species composition.

A public meeting was held on October 17, 2007 in order to inform lake users of the plant management activities and gain their input on the direction of the plan. The primary concern that came out of the meeting was a need to address the problems caused by common coontail. Another meeting was conducted with the LARE biologist, District Fisheries Biologist and representatives from VLAC on November 9. Sampling and treatment data along with a potential budget and action plan was presented and discussed at this meeting.

Information has been gathered over the past 2 years of vegetation surveys and management on Flint Lake. That information is used to create the following list of recommendations:

1. Continue with treatments of Eurasian watermilfoil with Renovate herbicide throughout the lake. Five acres or more of milfoil may require treatment next season.
2. Institute an early season curlyleaf treatment program. Approximately 23 acres of curlyleaf pondweed may need to be treated in 2008.
3. Complete a pre-treatment invasive mapping survey prior to the curlyleaf treatment in early spring and a Tier II survey in late July or early August.
4. Continue to assess, adjust, and update the Flint Lake Aquatic Vegetation Management Plan through 2011.

Acknowledgements

Funding for the vegetation sampling and preparation of an aquatic vegetation management plan was provided by the Valparaiso Lakes Area Conservancy District and the Indiana Department of Natural Resources Lake and River Enhancement Program. Aquatic Control, Inc. completed the fieldwork, data processing, and map generation. Special thanks are due to Bob Minarich and the Valparaiso Lakes Area Conservancy District for their help in initiating and completing this project. Special thanks are given to Bob Robertson, Fisheries Biologists for the Indiana Department of Natural Resources-Division of Fish And Wildlife, for his assistance and review of this plan. Special thanks are also given to Gwen White and Angela Studevant, Aquatic Biologist from the Lake and River Enhancement Program (LARE) for their review and assistance on this plan. Author of this report is Brendan Hastie of Aquatic Control. The author would like to acknowledge the valuable input from Brian Isaacs, Nathan Long, Joey Leach, and Barbie Huber of Aquatic Control for their field assistance, map generation, review, and editing of this report.

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1.0 INTRODUCTION

This report was created in order to update the Flint Lake Aquatic Vegetation Management Plan. The plan update was funded by the Indiana Department of Natural Resources Lake and River Enhancement Program (LARE) and the Valparaiso Lakes Area Conservancy District. The update serves as a tool to track changes in the vegetation community, to adjust the action plan as needed, and to maintain eligibility for additional LARE funds. Items covered include the 2007 sampling results, a review of the 2007 vegetation controls, and updates to the budget and action plans. Once reviewed and approved, the update should be included in the original vegetation management plan following the reference section and prior to the appendix.

2.0 PROBLEM STATEMENT

Aquatic vegetation is an important component of lakes in Indiana. However, as a result of many factors, this vegetation can develop to a nuisance level. Nuisance aquatic vegetation, as used in this paper, describes plant growth that negatively impacts the present uses of the lake including fishing, boating, swimming, aesthetic, and lakefront property values. The primary nuisance species within Flint Lake is the exotic species Eurasian watermilfoil. Curlyleaf pondweed is another submersed exotic species that is present in Flint Lake and has the potential to create nuisance conditions. Purple loosestrife is an invasive exotic emergent species that was also detected in previous sampling. This species will not likely create nuisance conditions for lake users, but could have negative impacts on native wetland species in and around Flint Lake.

3.0 2007 PLANT SAMPLING RESULTS

Two surveys were completed in 2007 in order to document changes in the plant community, to map for treatment areas, and to determine success or failure of control techniques. A spring invasive species mapping survey was completed in May of 2007. This survey was designed to select treatment areas and document changes in the plant community. A Tier II survey was completed in August. This survey was designed to monitor the effectiveness of the herbicide treatments, changes in the plant community, and to help plan for future plant management.

3.1 Spring Survey (Invasive Plant Mapping)

On May 15, 2007 a pretreatment survey for invasive plants was completed on Flint Lake. The survey revealed that 24.4 acres of Eurasian watermilfoil (Figure 1) existed within Flint Lake. The largest bed of Eurasian watermilfoil was found on the northeastern, eastern, and southeastern shores of the lake and covered 18.9 acres. The relative abundance of Eurasian watermilfoil was below 50% in this bed. A smaller bed of Eurasian watermilfoil was found on the western side of the lake. This bed was 5.5 acres, 3.5 acres of which had a relative abundance greater than 50%.

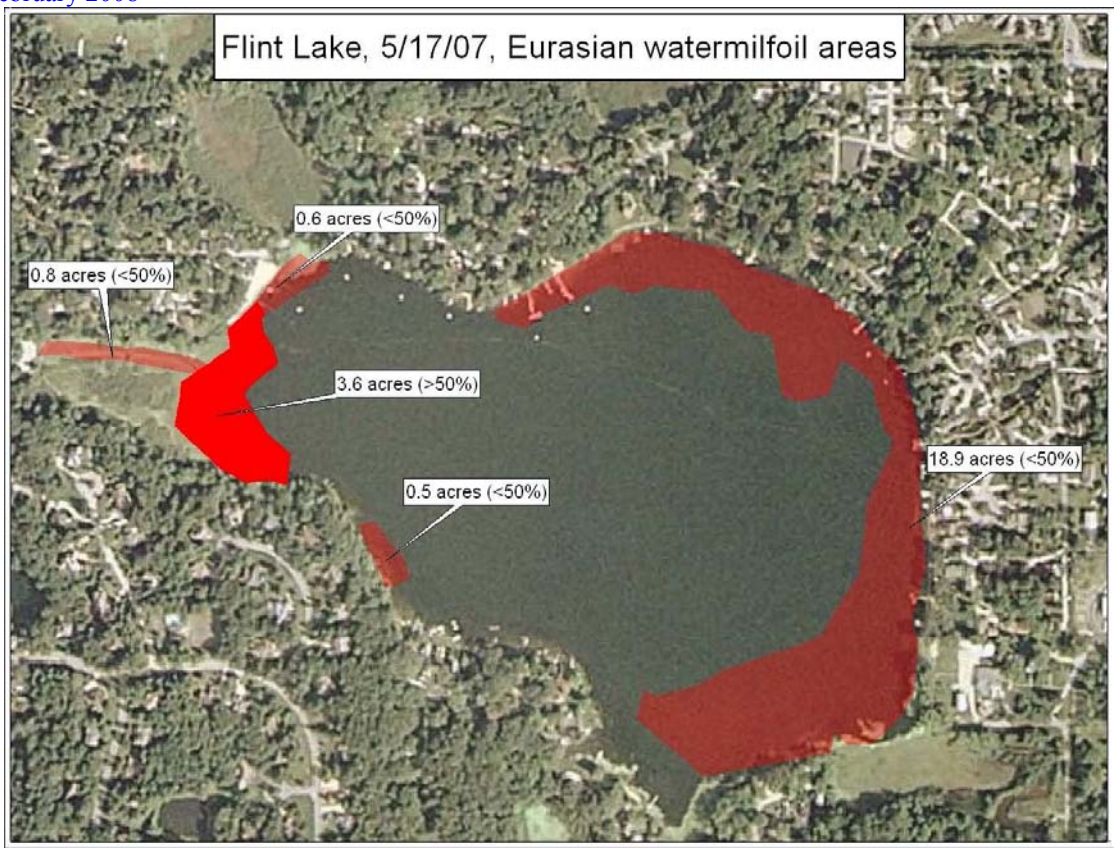

Figure 1. Pretreatment Eurasian watermilfoil beds, Flint Lake, May 15, 2007.

Curlyleaf pondweed was also found growing in 22.8 acres of Flint Lake at less than 25% abundance (Figure 2). 20.8 acres of curlyleaf pondweed was documented growing on the northeastern, eastern, and south-central shores of the lake. A two acre bed of curlyleaf pondweed was found to be growing on the western side of the lake.

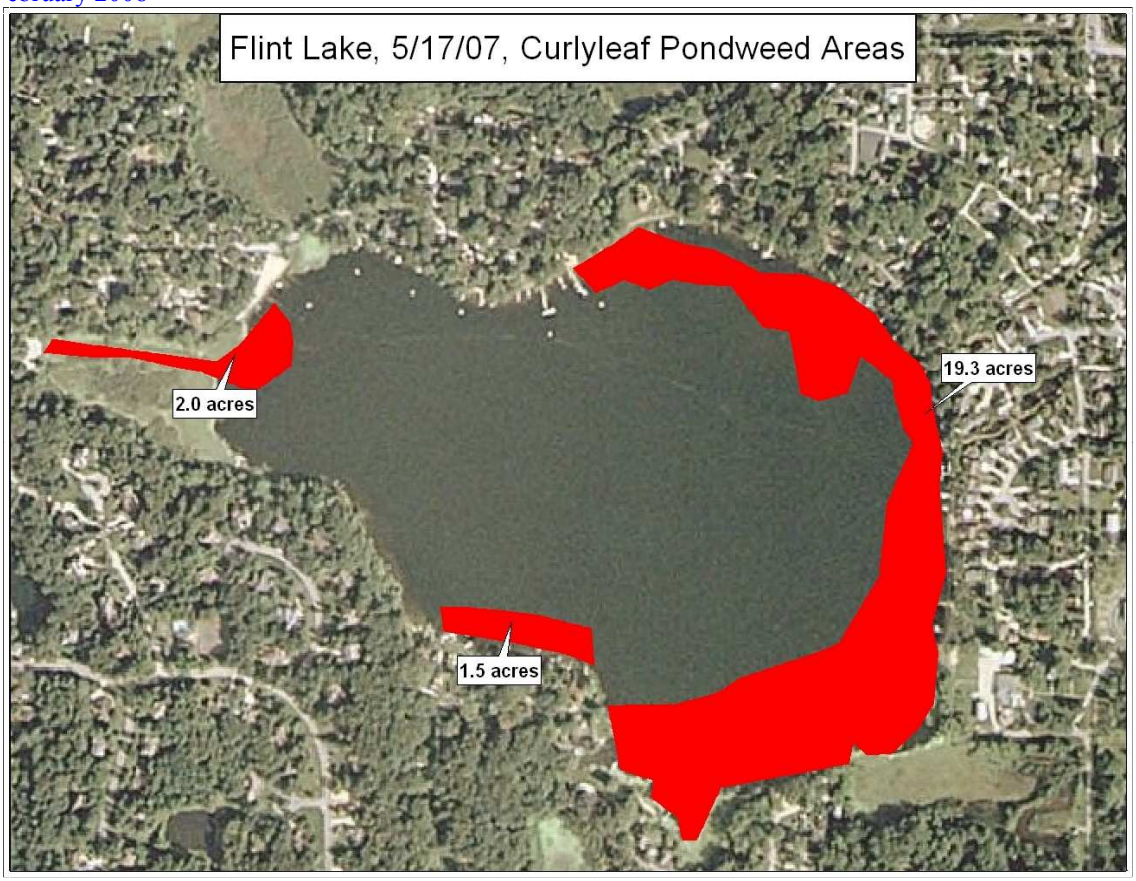

Figure 2. Pretreatment curlyleaf pondweed beds, Flint Lake, May 15, 2007.

3.2 Summer Survey (Tier II Survey)

Tier II sampling took place on August 8, 2007. A Secchi disk reading was taken prior to sampling and was found to be 6.0 feet. Plants were present to a maximum of 16.0 feet. 40 sites were sampled throughout the littoral zone. The same points used in the 2006 Tier II survey were used in this survey. A total of 11 species were collected of which all of the species were native. Thirty-eight of the forty sites contained vegetation. The maximum number of species collected at a site was 5. The average number of species per site was 2.3. Table 1 shows the results from the Tier II survey.

Table 1. Occurrence and abundance of submersed aquatic plants in Flint Lake August 8, 2007.

Occurrence and abundance of submersed aquatic plants in Flint Lake						
County:	Porter	Sites with plants:	38	Mean species/site:	2.30	
Date:	8.8.07	Sites with native plants:	38	Standard error (ms/s):	0.2213015	
Secchi (ft):	6	Number of species:	11	Mean native species/site:	2.30	
Maximum plant depth (ft):	16	Number of native species:	11	Standard error (mns/s):	0.2213015	
Trophic status	Mesotrophic	Maximum species/site:	5	Species diversity:	0.80	
Total sites:	40			Native species diversity:	0.80	

All depths (0 to 20 ft)	Frequency of	Rake score frequency per species				Plant Dominance
Species	Occurrence	0	1	3	5	
common coontail	82.5	17.5	0.0	10.0	72.5	68.5
flatstemmed pondweed	40.0	60.0	0.0	2.5	37.5	10.0
eel grass	32.5	67.5	2.5	0.0	30.0	19.5
Illinois pondweed	30.0	70.0	7.5	2.5	20.0	14.0
Richardson's pondweed	12.5	87.5	0.0	0.0	12.5	7.5
leafy pondweed	5.0	95.0	0.0	0.0	5.0	1.0
northern watermilfoil	5.0	95.0	0.0	0.0	5.0	1.0
American elodea	2.5	97.5	0.0	0.0	2.5	0.5
nitella	2.5	97.5	0.0	2.5	0.0	0.5
variable pondweed	2.5	97.5	0.0	2.5	0.0	0.5

Depth: 0-5ft	Frequency of	Rake score frequency per species				Plant Dominance
Species	Occurrence	0	1	3	5	
common coontail	69.2	30.8	0.0	0.0	69.2	53.8
eel grass	61.5	38.5	7.7	0.0	53.8	40.0
Illinois pondweed	53.8	46.2	15.4	0.0	38.5	35.4
flatstemmed pondweed	38.5	61.5	0.0	7.7	30.8	7.7
slender naiad	38.5	61.5	0.0	7.7	30.8	7.7
Richardson's pondweed	23.1	76.9	0.0	0.0	23.1	13.8
leafy pondweed	15.4	84.6	0.0	0.0	15.4	3.1
American elodea	7.7	92.3	0.0	0.0	7.7	1.5
nitella	7.7	92.3	0.0	7.7	0.0	1.5
variable pondweed	7.7	92.3	0.0	7.7	0.0	1.5

Depth: 5-10 ft	Frequency of	Rake score frequency per species				Plant Dominance
Species	Occurrence	0	1	3	5	
common coontail	100.0	0.0	0.0	0.0	100.0	90.0
flatstemmed pondweed	68.8	31.3	0.0	0.0	68.8	18.8
eel grass	31.3	68.8	0.0	0.0	31.3	16.3
Illinois pondweed	18.8	81.3	0.0	0.0	18.8	3.8
northern milfoil	12.5	87.5	0.0	0.0	12.5	2.5
Richardson's pondweed	12.5	87.5	0.0	0.0	12.5	7.5
slender naiad	6.3	93.8	0.0	0.0	6.3	1.3

Depth: 10-15 ft	Frequency of	Rake score frequency per species				Plant Dominance
Species	Occurrence	0	1	3	5	
common coontail	87.5	12.5	0.0	37.5	50.0	72.5
Illinois pondweed	25.0	75.0	12.5	12.5	0.0	5.0

Depth: 15-20 ft	Frequency of	Rake score frequency per species				Plant Dominance
Species	Occurrence	0	1	3	5	
common coontail	33.3	66.7	0.0	33.3	0.0	6.7

Other plants observed: Pickerel weed, cattail, spatterdock, white water lily, duckweed, watermeal, sago pondweed hibiscus, arrow arum, bladderwort, buttonbush, and star duckweed

Coontail was found at the highest percentage of sample sites (82.5%) for all depths (Figure 3). It also had the highest frequency of occurrence and dominance ratings for each depth range. It was the only species to be found growing deeper than 15 feet.

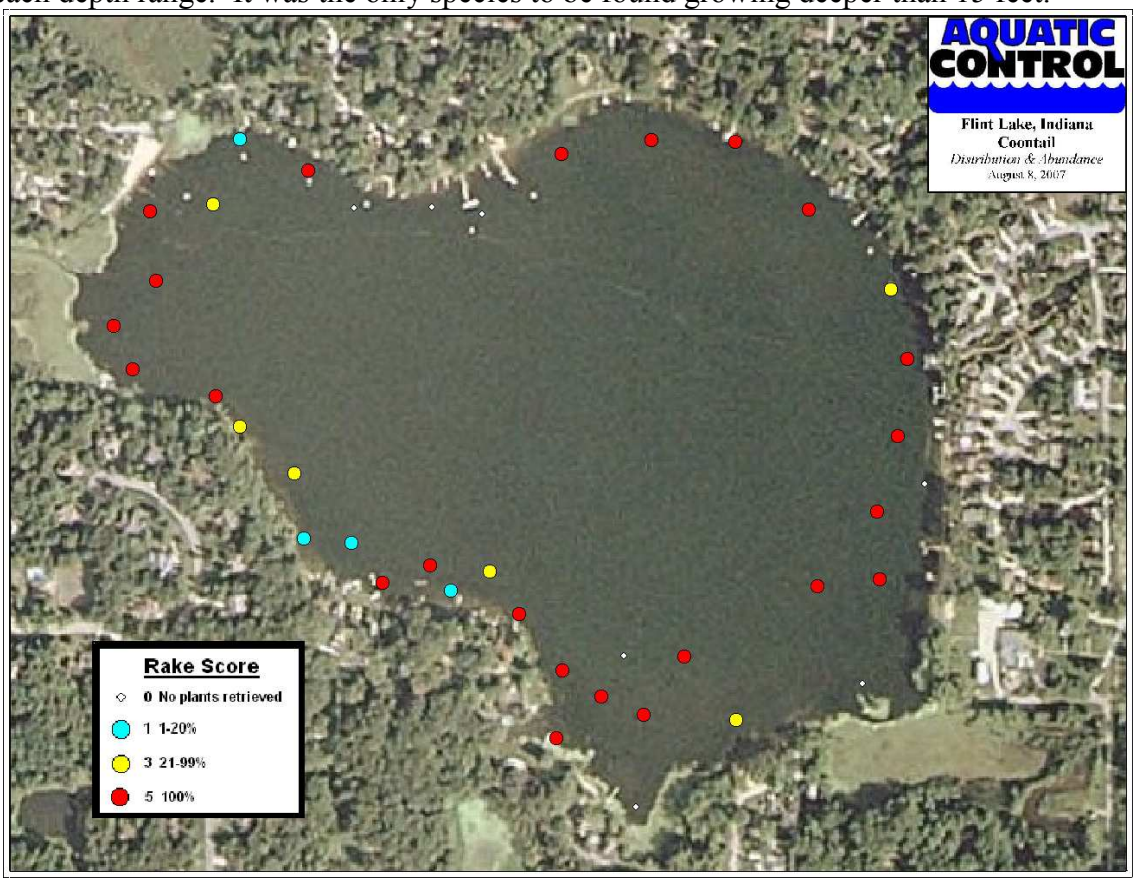

Figure 3. Flint Lake, coontail distribution and abundance, August 14, 2007.

Richardson's pondweed, listed as imperiled and rare in the state of Indiana, was present at 12.5% of the sample sites in the 2007 Tier II survey (Figure 4). This plant was found at two sites along the southern shore and three sites along the northern shore. It was found growing in depths of 5 to 7 feet.

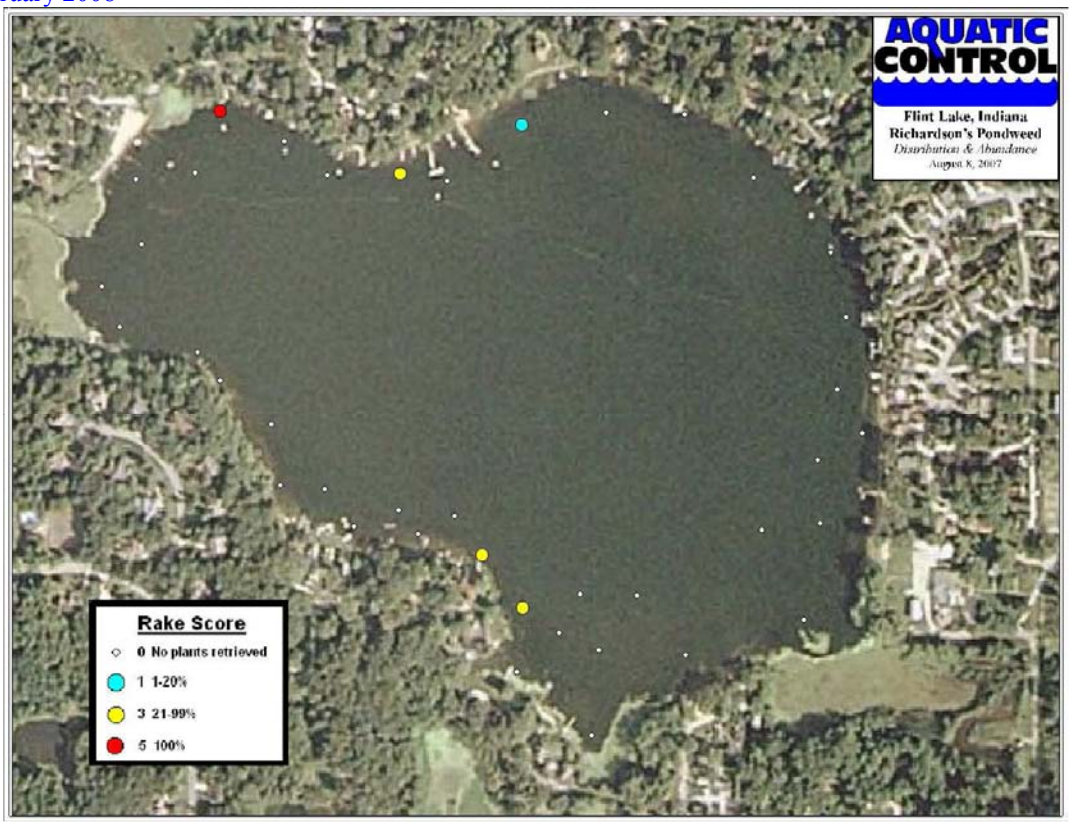

Figure 4. Flint Lake, Richardson's pondweed distribution and abundance, August 14, 2007.

Flatstem pondweed was the second most frequently occurring species in Flint Lake at the time of this survey (Figure 5). Flatstem pondweed was found at 40% of the sample sites in relatively low densities compared to coontail. This species was not found growing in water deeper than 10 feet. Eel grass was the third most frequently occurring species (32.5%) and formed dense stands in many of the places it was established (Figure 6). Eel grass was only observed growing in water shallower than 10 feet. The next most frequently occurring species was Illinois pondweed followed leafy pondweed, northern watermilfoil, American elodea, nitella, and variable pondweed.

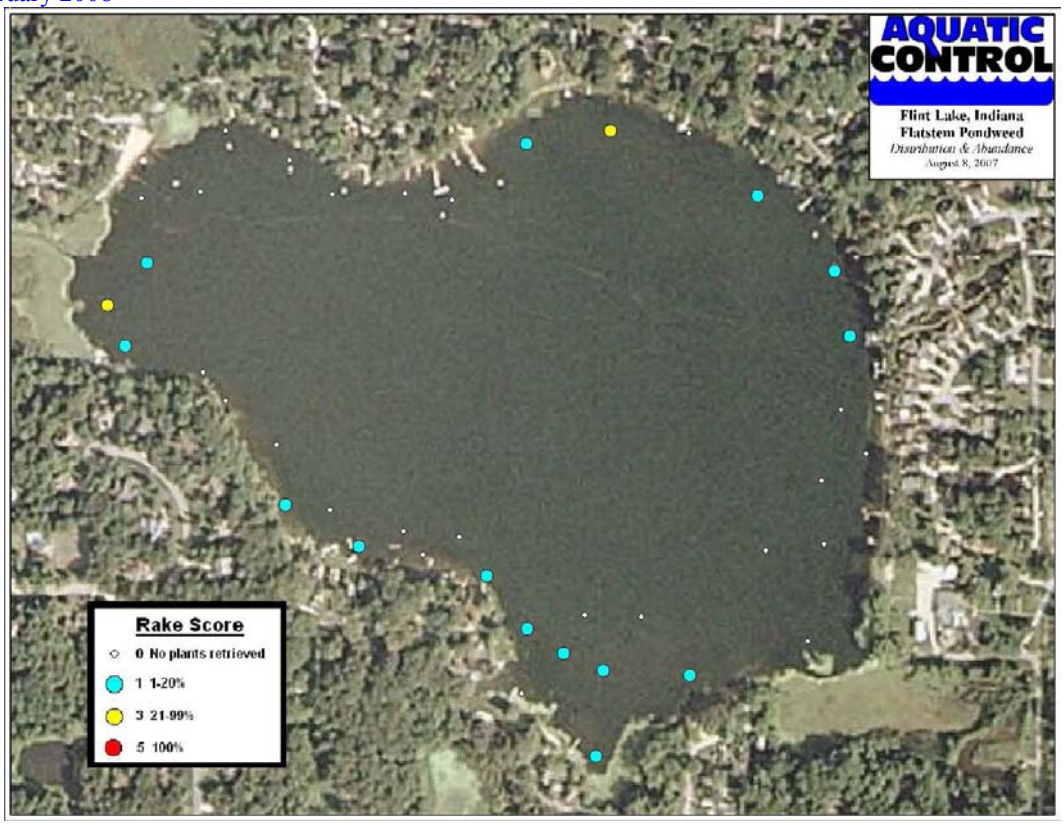

Figure 5. Flint Lake, flatstem pondweed distribution and abundance, August 14, 2007.

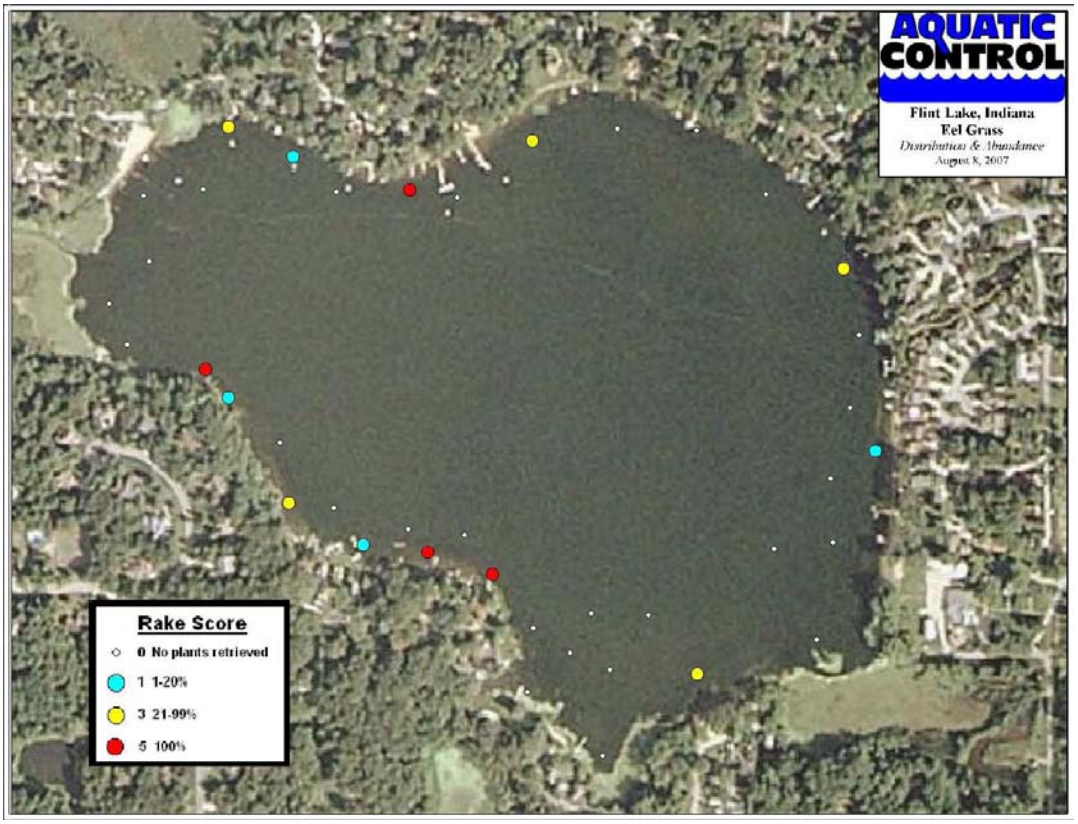

Figure 6. Flint Lake, eel grass distribution and abundance, August 14, 2007.

3.3 Aquatic Vegetation Sampling Discussion

The 2007 Tier II survey revealed that Flint Lake has a healthy and diverse plant community. Nine species of native plants were collected during the 2007 survey. A diverse native plant community is important for the water quality and fish production of Flint Lake and should be preserved. The goal of this plan is to preserve the native species while achieving control of nonnative and nuisance species.

Eurasian watermilfoil was found at 47.5% of the sites in the 2006 Tier II survey and 24.4 acres during the 2007 spring invasive species mapping survey. No Eurasian watermilfoil was found in Flint Lake following the 2007 treatment of the lake for this species (Table 4). The treatment appears to have been successful at controlling this non-native nuisance species.

Curlyleaf pondweed was found growing in over 13 acres of Flint Lake during the 2006 Tier I survey. It was present in 22.8 acres at 25% or less abundance during the 2007 invasive species mapping survey. No curlyleaf pondweed was found during the 2007 summer Tier II survey (it usually dies out during the warmer months of summer). From the information gathered over the past two growing seasons, it would appear that the presence of curlyleaf pondweed is increasing. The control of curlyleaf pondweed should be included with the Flint Lake Aquatic Vegetation Management plan to help protect the species diversity within the lake and reduce nuisance conditions caused by thin non-native species.

Common coontail has been a dominant plant within Flint Lake. Coontail was present in 17 acres according to the 2006 Tier I Survey and had 80% frequency of occurrence during the 2006 Tier II survey. Coontail was present at 82.5% of the sample sites and was the most dominant plant at all water depths during the 2007 Tier II survey.

Richardson's pondweed was found at 7.5% of the sampling sites during the 2006 Tier II survey. A slight increase (12.5% frequency of occurrence) was noted during the 2007 Tier II survey. Richardson's pondweed is listed on the Endangered, Rare, and Extirpated Plants of Indiana as imperiled and rare. Special attention to its distribution and locations should be made in order to limit the amount of damage to this species through future management practices.

Table 2 compares the frequency of occurrence for individual species from two years of data collected. Water stargrass had a 17.5 % frequency of occurrence in 2006, but was not detected in the 2007 Tier II survey. Likewise, chara was observed at 15% of the sites in 2006, but was not present in 2007. Variable pondweed and northern milfoil decreased from 2006 to 2007 while Illinois pondweed was found at a fairly high frequency. There is no clear explanation for the apparent decrease in water stargrass, chara, and variable pondweed. The decrease in northern watermilfoil may have been due to the herbicide application targeting Eurasian watermilfoil.

Table 2. Flint Lake, plant abundance comparison by year

Species	% of survey sites (8/06)	% of survey sites (8/07)
Eurasian watermilfoil *(Myriophyllum spicatum)*	47.5%	-
common coontail *(Ceratophyllum demersum)*	80.0%	82.5%
Chara (*Chara spp.*)	15.0%	-
prickly coontail *(Ceratophyllum echinatum)*	2.5%	-
Slender naiad *(Najas flexillis)*	7.5%	15.0%
sago pondweed *(Potamogeton pectinatus)*	2.5%	-
eel grass *(Vallisneria americana)*	42.5%	32.5%
American elodea *(Elodea canadensis)*	-	2.5%
leafy pondweed *(Potamogeton foliosus)*	12.5%	5.0%
flatstem pondweed *(Potamogeton zosteriformis)*	17.5%	40.0%
Richardson's pondweed *(Potamogeton richardsonii)*	7.5%	12.5%
variable pondweed *(Potamogeton gramineus)*	22.5%	2.5%
northern watermilfoil *(Myriophyllum sibiricum)*	35.0%	5.0%
variable milfoil *(Myriophyllum heterophyllum)*	2.5%	-
water stargrass *(Zosterella dubia)*	17.5%	-
nitella *(Nitella spp.)*	2.5%	2.5%
Illinois pondweed *(Potamogeton illinoensis)*	-	30.0%
unknown species	2.5%	-

Future sampling should be completed in a similar manner through 2011. This sampling will provide valuable information that can be used to effectively control nuisance species and preserve beneficial natives.

4.0 2007 VEGETATION CONTROL

Non-selective contact treatments and selective systemic treatments were completed on Flint Lake on June 5, 2007. The contact treatments were funded by individual property owners and consisted of applying Aquathol, Reward, and Komeen aquatic herbicides to near-shore nuisance areas. This type of treatment is not funded by the LARE program and requires an independent permit to be approved before chemical application can take place. The contact treatment was completed on June 5, 2007. The plants targeted by the contact treatment were curlyleaf pondweed, Eurasian watermilfoil, and common coontail. Two acres were treated along the southern shore (Figure 7).

Figure 7. Flint Lake, contact herbicide treatment area June 5, 2007.

On June 5, 2007 a LARE funded selective systemic treatment was completed by Aquatic Control Inc. to target Eurasian watermilfoil. Treatment areas were selected from the spring pretreatment invasive plant mapping results. The Eurasian watermilfoil beds were downloaded to handheld GPS units. Renovate3 (active ingredient triclopyr) was applied via dropper hoses at a rate of 1.25 parts per million (ppm). A total of 24.4 acres of milfoil were treated (Figure 8). On August 8, the lake was inspected and no Eurasian watermilfoil was found.

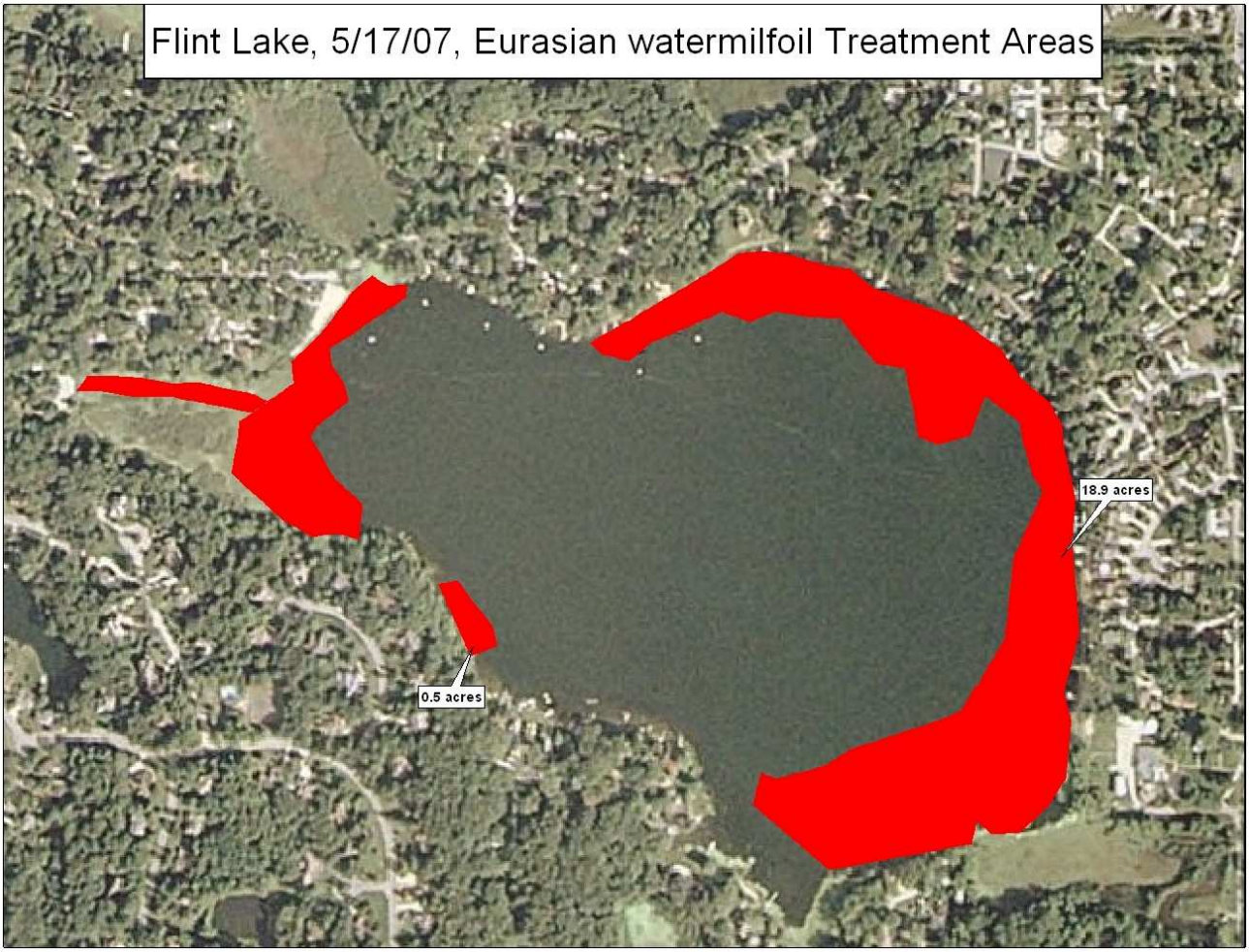

Figure 8. Flint Lake, systemic herbicide treatment area June 5, 2007.

5.0 ACTION PLAN AND BUDGET UPDATE

It is recommended that the Valparaiso Lake Area Conservancy District continue with similar plant management controls next season with a few exceptions. We also recommend that the VLAC continue to hold public meetings to further inform the public on invasive plants and best management practices for lawn and shoreline areas.

The selective milfoil treatments must be completed prior to the summer plant sampling. Areas should be mapped during the spring sampling and treated in late spring or early summer. Estimating the amount of milfoil that will require treatment is very difficult. The original plan predicted 23 acres would need treatment, but based on this years results as little as 1-2 acres or as much as 20 acres may return (Flint Lake is connected to several other lakes infested with Eurasian watermilfoil). Based on this year's sampling and past treatments, it is recommended that the association should request enough funds to treat up to 20 acres of milfoil with Renovate liquid herbicide. The maximum cost of such a treatment would be $9,000.00. Liquid Renovate should be used in areas bigger than 5 acres with an average depth less than 6.0 feet. Granular 2,4-D should be used in areas that are either less than 5.0 acres or that have an average depth greater than 6.0 feet.

In addition, it is recommended that the association request $5,750 for treatment of 23 acres of curlyleaf pondweed. Aquathol K should be applied at a rate of 1.0 part per million (ppm) once the water reaches a constant 50° F.

At least two surveys should be completed in 2008. The first survey should be completed in late May or early June and be focused on mapping out treatment areas. The second survey should be completed in late summer and focus on assessing the effects of the treatment on native and targeted exotic vegetation. A tier II survey, similar to the one completed in 2007, should be sufficient to achieve this goal. If curlyleaf pondweed funding is received, an April Tier II and invasive mapping survey should also be completed. This would increase sampling cost by $1,000.

It is recommended that the Association request $9,000 for treating up to 20 acres of Eurasian watermilfoil, $5,750 for treatment of up to 23 acres of curlyleaf pondweed, and $4,000 for plant sampling and updating the 2008 plan.

Table 3. Budget estimates for management options

	2008	2009	2010	2011
Selective treatment of Eurasian watermilfoil with Renovate herbicide	$9,000	$7,000	$5,000	$3,000
Early season treatment of curlyleaf pondweed with Aquathol K	$5,750	$5,750	$5,750	$5,750
AVMP update*	$4,000*	$4,000*	$4,000*	$4,000*
Total:	**$18,750**	**$16,750**	**$14,750**	**$12,750**

* May require an addition $1,000 if early season curlyleaf pondweed treatment is funded

6.0 PUBLIC PARTICIPATION

An effective aquatic vegetation management plan must include input from lake users. A public meeting was held on October 17, 2007 at the Flint Lake Church of Christ. The meeting was advertised in the local newspaper and on the VLACD website. The public meeting was held in order to gain input concerning the plan from lake users, educate lake users on the benefits of native vegetation, inform lake users about the 2007 vegetation controls, and to update lake users on 2008 plans. Twelve people were present for the meeting. Eight of those in attendance took the time to fill out a survey form. Table 4 shows the results from the survey. The survey respondents indicated that 50% were property owners, and 75% were members of the lake association. As far as uses of the lake, 62.5% of them used the lake for boating, 50% used the lake for fishing, 50% for swimming, and 12.5% for other activities (not specified).

Concerning problems with the lake, 62.5% said that there were too many plants in the lake, 25% responded that there were poor water quality issues, 25% thought there were problems with the fish population, 25% said that there was overuse by nonresidents, 12.5% felt that too many boats access the lake, 12.5% said there was a problem with jet ski usage on the lake, 12.5% felt that there were Pier/funneling problems, and 12.5% felt that dredging was needed.

All of the individuals indicated that they were in favor of continuing with the aquatic plant treatments and were happy with the results thus far. There was also concern expressed about the lack of parking at the public boat ramp. A public meeting for Long Lake was held at this location on the same evening shortly after the Flint Lake meeting.

Table 4. 10/17/07 Public meeting survey results

Flint Lake User Survey 10/17/07		
Are you a lake property owner?	Yes 50%	No 50%
Are you currently a member of your lake association?	Yes 75%	No 25%
How many years have you been at the lake?	2 or Less: 0%	5 to 10: 12.5%
	2 to 5: 0%	Over 10: 50%
How do you use the lake (mark all that apply)	50% Swimming	0% Irrigation
	62.5% Boating	0% Drinking water
	50% Fishing	12.5% Other_____
Do you have aquatic plants at your shoreline in nuisance quantities?	Yes: 50% No: 25%	25% no response
Does aquatic vegetation interfere with your use or enjoyment of the lake?	Yes: 75% No: 12.5%	12.5% no response
Does the level of vegetation in the lake affect your property values?	Yes: 50% No: 25%	25% no reponse
Are you in favor of continuing efforts to control vegetation on the lake?	Yes: 100% No: 0%	
Are you aware that the LARE funds will only apply to work controlling invasive exotic species, and more work may need to be privately funded?	Yes: 100% No: 0%	
Were you satisfied with the results of the LARE funded invasive treatments this season?	Yes: 100% No: 0%	
Mark any of these you think are problems on your lake:		
12.5% Too many boats access the lake		
12.5% Use of jet skis on the lake		
0% Too much fishing		
25% Fish population problem		
12.5% Dredging needed		
25% Overuse by nonresidents		
62.5% Too many aquatic plants		
0% Not enough aquatic plants		
25% Poor water quality		
12.5% Pier/funneling problem		

Another topic discussed at the public meeting was the recent discovery of hydrilla (*Hydrilla verticillata*) in Lake Manitou. Hydrilla is an invasive aquatic species that was originally discovered in Florida in the 1960's. There are many characteristics of hydrilla

that make it a threat to Indiana waterways. This species can grow in lower light conditions than most native species, grows faster than most native species, and can shade out other species by forming a surface canopy. Hydrilla can be easily confused with native elodea. The best way to distinguish hydrilla from native elodea is that hydrilla typically has five leaves along each whorl along with visible serrated edges along the leaf margin (Figure 9). What makes controlling the spread of hydrilla difficult is the fact that it can be spread by fragments. **That is why it is vitally important that lake users remove all plants and sediment from their boats when entering and leaving the Valparaiso Chain of Lakes.** At this time, hydrilla has not been discovered in Flint Lake. More information about controlling the spread of hydrilla can be found at www.protectyourwaters.net.

Figure 9. Illustration of hydrilla on the left compared to native elodea on the right. Hydrilla typically contains five toothed leaves per whorl while native elodea typically has three leaves per whorl and the teeth are not visible on the leaves (Illustrations provided by Applied Biochemist).

It should be noted that the VLACD has been very proactive about educating the public. The board of the VLACD has asked residents to correct erosion problems, and when ignored, has sought legal means to rectify the actions of irresponsible lot owners. The group has also been very aggressive with replacing the septic systems in the area with sewage service. The VLACD plans on adding an additional 16 lots to the sewage system on Long Lake later this year. This board has been very active within the watershed as a whole. They have been promoting dialog between local government and commercial builders to ensure that best management practices are followed to protect their natural resources.

7.0 REFERENCES CITED

Endangered, Threatened, and Rare Vascular Plant Species Documented from Indiana 10 April 1996. Division of Natural Preserves, Indiana Department of Natural Resources. 14 February 2008. < http://www.in.gov/dnr/naturepr/endanger/plant.html >

8.0 APPENDIX UPDATE-2007 SAMPLING DATA

8.1 August Tier II Survey

Lake	Date	Latitude	Longitude	Site	Depth	RAKE	common coontail (*Ceratophyllum demersum*) CEDE4	Slender naiad (*Najas flexilis*) NAFL	eel grass (*Vallisneria americana*) VAAM3	American elodea (*Elodea canadensis*) ELCA7	leafy pondweed (*Potamogeton foliosus*) POFO3	flatstemmed pondweed (*Potamogeton zosteriformis*) POZO	Richardson's pondweed (*Potamogeton richardsonii*) PORI2	variable pondweed (*Potamogeton gramineus*) POGR8	northern watermilfoil (*Myriophyllum sibiricum*) MYSI	nitella (*Nitella spp.*) NI?TE	Illinois pondweed (*Potamogeton illinoensis*) POIL
Flint	8.8.07	41.510774	-87.041556	1	6.0	5	3		3			1					
Flint	8.8.07	41.511095	-87.040115	2	5.0	1											1
Flint	8.8.07	41.511916	-87.040626	3	13.0	5	5										
Flint	8.8.07	41.511969	-87.039917	4	8.0	5	5										
Flint	8.8.07	41.512791	-87.039411	5	3.0	1			1								1
Flint	8.8.07	41.513195	-87.039716	6	10.0	5	5										
Flint	8.8.07	41.513854	-87.039607	7	10.0	5	5					1					
Flint	8.8.07	41.514444	-87.039793	8	6.0	5	3		3			1					1
Flint	8.8.07	41.515129	-87.040726	9	7.0	5	5					1					
Flint	8.8.07	41.515705	-87.041566	10	3.0	5	5				1						
Flint	8.8.07	41.515717	-87.042521	11	7.0	5	5					3			1		
Flint	8.8.07	41.515599	-87.043549	12	7.0	5	5		3			1	1				1
Flint	8.8.07	41.515096	-87.044456	13	16.0	0											
Flint	8.8.07	41.515160	-87.045032	14	5.0	5		1	5		1		3				3
Flint	8.8.07	41.515152	-87.045918	15	11.0	1											1
Flint	8.8.07	41.515459	-87.046440	16	7.0	5	5	1	1								1
Flint	8.8.07	41.515725	-87.047220	17	6.0	5	1		3				5				
Flint	8.8.07	41.515174	-87.047525	18	14.0	3	3										
Flint	8.8.07	41.515113	-87.048252	19	7.0	5	5								1		
Flint	8.8.07	41.514519	-87.048179	20	10.0	5	5					1					
Flint	8.8.07	41.514134	-87.048660	21	9.0	5	5					3					
Flint	8.8.07	41.513769	-87.048443	22	8.0	5	5					1					
Flint	8.8.07	41.513536	-87.047501	23	4.0	5	5		5								
Flint	8.8.07	41.513279	-87.047220	24	2.0	5	3	1	1								5
Flint	8.8.07	41.512871	-87.046599	25	11.0	3	3										1
Flint	8.8.07	41.512319	-87.046487	26	4.0	5	1	1	3			1					5
Flint	8.8.07	41.512285	-87.045944	27	16.0	3	1										
Flint	8.8.07	41.511939	-87.045592	28	4.0	5	5		1			1					
Flint	8.8.07	41.512089	-87.045054	29	11.0	5	5										
Flint	8.8.07	41.511878	-87.044809	30	4.0	5	1	1	5								5
Flint	8.8.07	41.512036	-87.044368	31	12.0	3	3										
Flint	8.8.07	41.511679	-87.044038	32	5.0	5	5		5			1	3				3
Flint	8.8.07	41.511198	-87.043543	33	5.0	5	5					1	3				
Flint	8.8.07	41.511331	-87.042840	34	16.0	0											
Flint	8.8.07	41.510973	-87.043093	35	9.0	5	5					1					
Flint	8.8.07	41.510617	-87.043610	36	3.0	5	5			1							
Flint	8.8.07	41.510819	-87.042616	37	7.0	5	5					1					
Flint	8.8.07	41.510040	-87.042705	38	3.0	3		1				1		1		1	
Flint	8.8.07	41.511314	-87.042152	39	13.0	5	5										
Flint	8.8.07	41.512546	-87.039946	40	13.0	5	5										

8.2 2008 Vegetation Control Permit Application

APPLICATION FOR AQUATIC VEGETATION CONTROL PERMIT

State Form 26727 (R / 11-03)
Approved State Board of Accounts 1987

[ ] Whole Lake [X] Multiple Treatment Areas
Check type of permit

INSTRUCTIONS: Please print or type information

FOR OFFICE USE ONLY
License No.
Date Issued
Lake County

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DEPARTMENT OF NATURAL RESOURCES
Division of Fish and Wildlife
Commercial License Clerk
402 West Washington Street, Room W273
Indianapolis, IN 46204

FEE: $5.00

Applicant's Name	Lake Assoc. Name	
Valparaiso Area Lakes Conservancy District	Valparaiso Area Lakes Conservancy District	
Rural Route or Street: 1805 Burlington Beach Road		Phone Number: 219-464-3770
City and State: Valparaiso IN		ZIP Code: 48383
Certified Applicator (if applicable)	Company or Inc. Name	Certification Number
Rural Route or Street		Phone Number
City and State		ZIP Code

Lake (One application per lake)	Nearest Town	County	
Flint Lake	Valparaiso	Porter	
Does water flow into a water supply		[ ] Yes	[X] No

Please complete one section for *EACH* treatment area. Attach lake map showing treatment area and denote location of any water supply intake.

Treatment Area # 1	LAT/LONG or UTM's: Areas to be determined following spring survey (See AVMP)		
Total acres to be controlled: <20	Proposed shoreline treatment length (ft)	Perpendicular distance from shoreline (ft)	
Maximum Depth of Treatment (ft): 12	Expected date(s) of treatment(s): mid May to early June		

Treatment method: [X] Chemical [ ] Physical [ ] Biological Control [ ] Mechanical

Based on treatment method, describe chemical used, method of physical or mechanical control and disposal area, or the species and stocking rate for biological control. Renovate or 2,4-D herbicide to selectively control Eurasian watermilfoil wherever it occurs

Plant survey method: [X] Rake [X] Visual [ ] Other (specify) Summarized from Spring survey

Aquatic Plant Name	Check if Target Species	Relative Abundance % of Community
Eurasian watermilfoil	x	25
Common coontail		30
curlyleaf pondweed		25
Richardson's pondweed		5
Northern watermilfoil		3
Variable pondweed		3
Flatstem pondweed		3
Illinois pondweed		2
sago pondweed		2
eel grass		2

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Treatment Area #	2	LAT/LONG or UTM's	Areas to be determined following spring sampling
Total acres to be controlled	<24	Proposed shoreline treatment length (ft)	Perpendicular distance from shoreline (ft)
Maximum Depth of Treatment (ft)		Expected date(s) of treatment(s)	late April or early May

Treatment method: [X] Chemical [ ] Physical [ ] Biological Control [ ] Mechanical

Based on treatment method, describe chemical used, method of physical or mechanical control and disposal area, or the species and stocking rate for biological control. Aquathol K herbicide at 1.0 ppm once water hits 50 degrees wherever clp occurs

Plant survey method: [ ] Rake [ ] Visual [ ] Other (specify) Summarized from August Sampling

Aquatic Plant Name	Check if Target Species	Relative Abundance % of Community
Eurasian watermilfoil		25
Common coontail		30
curlyleaf pondweed	x	25
Richardson's pondweed		5
Northern watermilfoil		3
Variable pondweed		3
Flatstem pondweed		3
Illinois pondweed		2
sago pondweed		2
eel grass		2

INSTRUCTIONS: Whoever treats the lake fills in "Applicant's Signature" unless they are a professional. If they are a professional company who specializes in lake treatment, they should sign on the "Certified Applicant" line.

Applicant Signature	Date
Certified Applicant's Signature	Date

FOR OFFICE ONLY

[ ] Approved [ ] Disapproved	Fisheries Staff Specialist
[ ] Approved [ ] Disapproved	Environmental Staff Specialist

Mail check or money order in the amount of $5.00 to:

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF FISH AND WILDLIFE
COMMERCIAL LICENSE CLERK
402 WEST WASHINGTON STREET ROOM W273
INDIANAPOLIS, IN 46204